Plan Formulation Considerations in Dam Removals for Restoration

Breaching of Edwards Dam, Kennebec River, ME, 7/1/99

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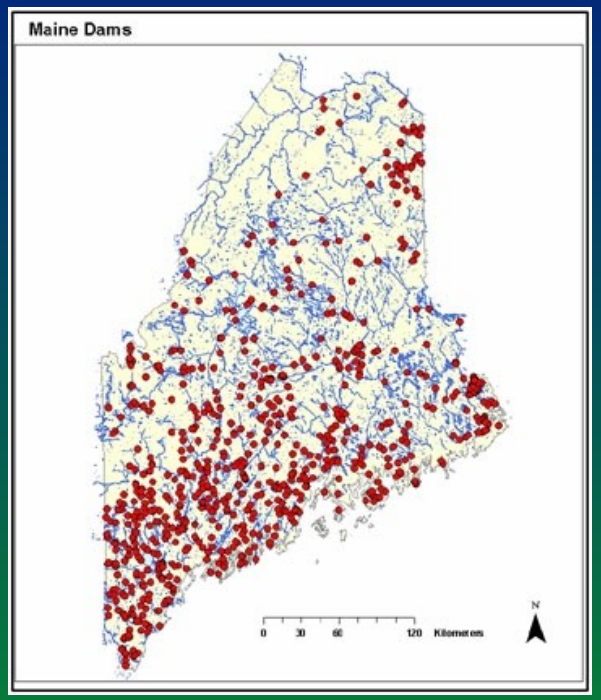
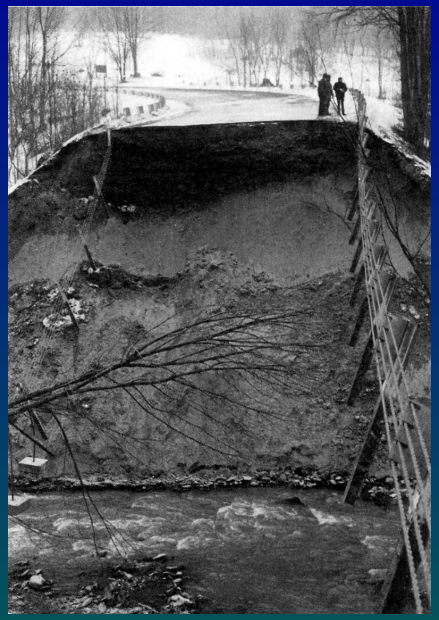
Needs and Problems

- 2,500,000 dams in US; 58,000 large dams will exceed their design lifespan by 2020 (FEMA).
- 2000-2001: 61 dam failures and 520 incidents, 2100 structures classified as unsafe (ASCE).
- Dams fragment habitat, truncate populations, and alter hydrology, sediment budgets, water quality, and nutrient cycling.
- Important ecological and physical impacts of removals and retrofits not considered. Agencies demand guidelines for effective fate determination and implementation.



St. Francis Dam failure, CA, 1928

Teton Dam failure, ID, 1976



Chase Brook Bridge collapse caused by private dam failure, NY, 1996.

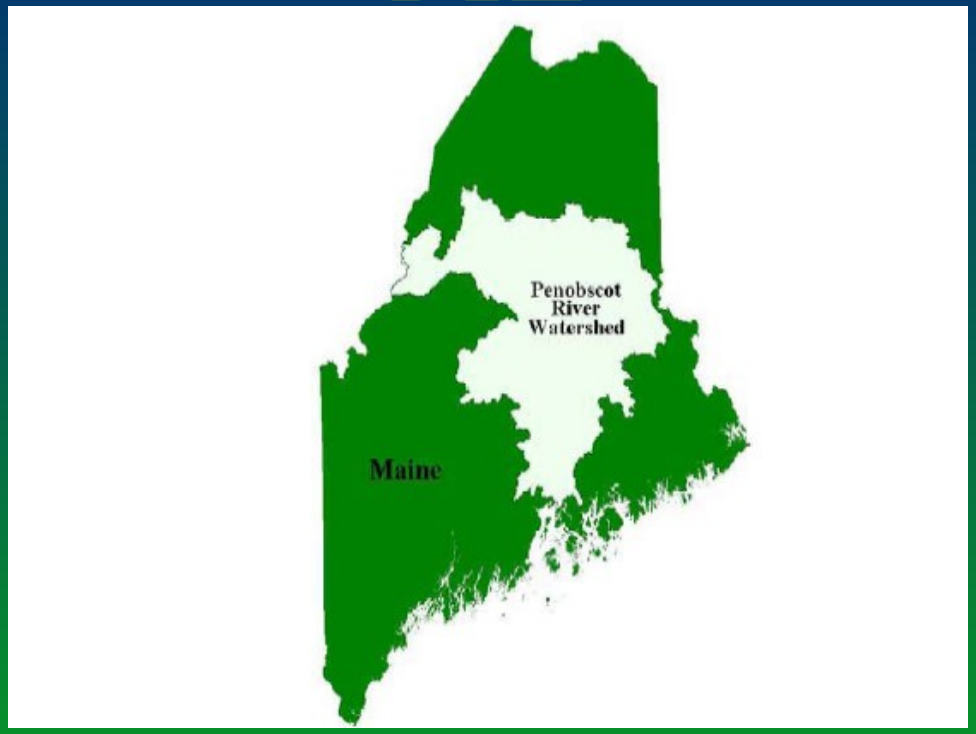
Rockfish Creek dam failure, NC, 2003

“Blow and Go”

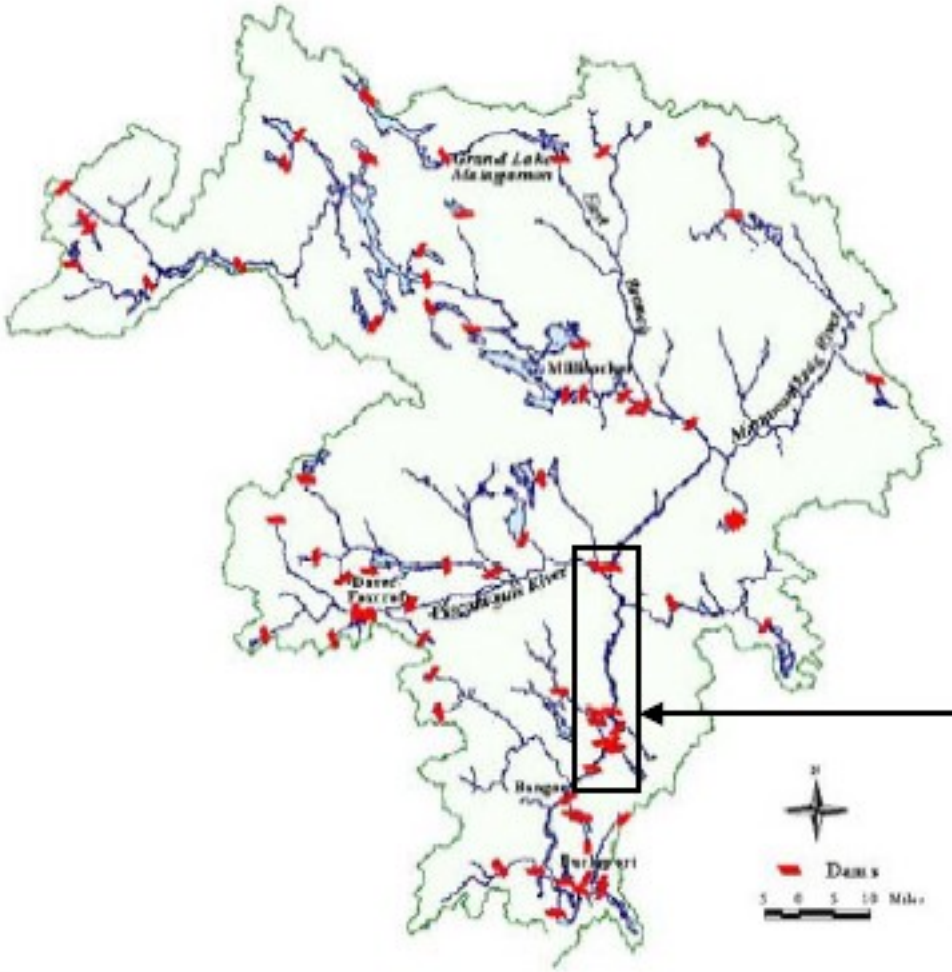
Central Dam Fate Determination Issues

- Alternatives
- Impacts and benefits to T&E populations, prey and keystone populations, invasive species (e.g., reed canarygrass, lampreys)
- Fish passage and related issues
- Ecological and economic values and costs
- System stability assessment and sediment management
- Flood dynamics, ice formation and routing, sediment transport
- Risk assessment
- Design, staging, and monitoring considerations

Prioritization in Dam Removals and Retrofitting —the Penobscot Project, ME



Penobscot River Watershed Dams



113 Dams

20 hydro-generating

93 non-generating

Project Area

Projected Benefits from Penobscot Project

Species	Current	Potential
Alewives	Below 1,000	4-6 million
Atlantic salmon	Below 1,000	10,000-12,000
American shad	Near 0	1.5 million

EMRRP Dam Removal/Retrofit/Re-ops Work Unit Objectives

- Develop detailed technical guidance for the planning, evaluation, and execution of dam decommissioning, retrofit, and operations optimization projects
- Develop tools and protocols for basin, reach, and project scale alternative impact assessment and prioritization
- Initiate a comprehensive technical program to manage a pressing infrastructure, public safety, and ecological restoration problem
- Build capacity and position the Corps for a leadership role
- Aid regulatory oversight

Drawdown, Cougar Reservoir, OR

EMRRP WU Technology Transfer Plan

- Technical publications
- PROSPECT courses
- Interagency workshops
- Collaborative demonstrations
- Web-based and CD-based tools
- Journal papers for peer review

Additional Resources 1

- 6/04, Dam Decommissioning WOTS workshop. http://www.wes.army.mil/el/wots/techwork.html
- EWRI dam removal series: http://www.ewrinstitute.org/damremoval04/
- Conyngham, Fischenich, and White, 2004. Engineering and Ecological Aspects of Dam Removal—An Overview. http://www.wes.army.mil/el/emrrp/tnotes.html
- White, K.D. USACE, 2001. Considerations for dam removal in ice-affected rivers. http://www.crrel.usace.army.mil/ierd/tectran/27InDesign.pdf

Additional Resources 2

- **AIBS, 2002. *BioScience—A Special Section on Dam Removal and River Restoration* 52(8): 643-750.**
- **American Rivers. Various publications. www.amrivers.org ->Resources->Toolkits**
- **ASCE, 1997. *Guidelines for Retirement of Dams and Hydroelectric Facilities. http://www.pubs.asce.org***

Additional Resources 3

- Aspen Institute, 2002. *Dam Removal: A New Option For a New Century.* http://www.aspeninstitute.org->Bookstore
- Heinz Center, 2002. *Dam Removal: Science and Decision Making.* Washington, D.C.: H. John Heinz III Center for Science, Economics and the Environment.